

*What About Preservatives In Making Legume Silage?*¹

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How can we make good legume silage? This question is being asked increasingly by farmers who turn to newer methods of harvesting legume crops. It is true that the ensiling of legumes has much to offer. It lets us "make hay" even when the sun doesn't shine. It offers wide opportunities for mechanized labor. It reduces losses from leaching, bleaching, shattering and possible over-maturity. Too often, however, it "stinks" or even burns black.

Legume silages present several problems to the farm operator who desires high quality silage. Legumes are high in protein, which leads to difficulties in preservation. The judging of optimum moisture content of chopped forage is difficult. Wilting of grasses or legumes for ensilage is neither desirable nor economical if one wishes to make the most of labor-saving devices.

Silage-making experiments have been carried on at various experiment stations throughout the United States. Efforts have been made to determine which methods will best overcome the problems of making legume silage. The following observations will include experiences on the various techniques reported at other institutions as well as observations on results of trials at this station.

There are three methods of preserving chopped legumes as silages which have been used with good results. The methods are those as outlined below.

1. Wilting of Forage Before Ensiling

This is a commonly recommended procedure for making grass silages. Good results can be obtained by cutting grasses and legumes and allowing them to wilt. It is recommended that chopped forage be not higher in moisture content than approximately 65 to 70 per cent when ensiled. One can also reduce moisture content by allowing the grasses or legumes to mature somewhat longer. Increasing maturity, however, generally lowers quality of silage. The Dairy Department at North Dakota Agricultural College has obtained good legume silage with no preservatives by wilting before ensiling chopped forage. The silage so handled had a pleasing odor, good texture and was palatable to dairy cattle. Alfalfa silage in these college trials in 1954 was rated excellent when ensiled directly from the forage harvested at 70 per cent moisture.

The chief objection to wilting of legumes for silage has been the uncertainty of the quality of silage obtained. It is difficult to judge accurately the correct moisture content of the chopped forage. Perhaps not as serious is the fact that wilting requires extra handling. Wilting would, of course, require weather conditions

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which allow for drying. Silages made from legumes without added preservatives also have been criticized frequently for having extremely objectionable odors and too often are slimy in texture.

2. Addition of Carbohydrate Materials.

The addition of grain or molasses has proven to be a method whereby legume silages of good quality may be obtained. The addition of carbohydrate materials aids in formation of acids by bacterial growth. It is generally recommended that 100 to 150 pounds of cracked corn or ground barley be added to each ton of freshly chopped forage. The addition of molasses at the rate of approximately 80 pounds per ton of chopped alfalfa forage is recommended.

Lambs that were fed silage preserved with 200 pounds of cracked corn per ton in 1954 feeding trials made significantly greater gains than lambs fed alfalfa silage preserved with chemicals or no added preservatives. This is as expected, since some authorities estimate that as much as 70 per cent of the carbohydrate value is recovered in the feed value of silage preserved with carbohydrates.

3. Chemical Silage Preservatives.

Chemical preservatives of one type or another have been popular in countries of the Old World for some time. These preservatives retard the growth of putrefying bacteria and thus aid in the making of good quality silage.

Two types of chemicals have been employed with favorable results in silage preservation. Perhaps the most widely accepted chemical preservative in the United States is sodium bisulfite. Research at various institutions indicates that cattle prefer silage preserved with sodium bisulfite to that made with no preservatives. Trials at this station with sheep in 1954 did not indicate any differences in palatability as measured by total silage consumption in a nine week feeding trial. Alfalfa forage preserved with eight pounds of sodium bisulfite per ton had an excellent odor, bright green color and was palatable. Sodium bisulfite can be applied with various types of commercial applicators. The most serious objection to the use of sodium bisulfite is its irritating dust when applied at the blower for upright silos. It is not recommended that a man be in the silo except between loads. Irritations due to sodium bisulfite can be overcome when it is applied to the forage at the time it is chopped in the field.

The second type of chemical preservative in use is calcium formate, sold under the trade name of Kyalage. Silage made in 1954 at North Dakota Agriculture College with calcium formate was judged very good in color, palatability and odor. There was no significant difference between chemically preserved silages in our trials in rate of gain or rate of consumption. However, these two observations were made:

1. Ewe lambs fed silage preserved with calcium formate gained the slowest of any lot.
2. Ewe lambs fed silage preserved with calcium formate tended to scour. This was not observed in any other lot. This may have

been caused by improper application of Kylage to the chopped forage.

It was noted that calcium formate was easy to work with when filling the silo as there was no irritation to humans due to the addition of calcium formate at the blower.

Experiences and results obtained at various experiment stations indicate the following conclusions regarding preservatives for legume silages:

1. Good quality silage can be readily obtained without preservatives, but preservatives will permit silage-making over a wider range of conditions.

2. At the present cost of approximately \$1 per ton, it is doubtful whether chemical preservatives are economical except under adverse conditions or where chopped forages are very high in moisture and are ensiled directly from the field.

3. Preservatives will help to alleviate the objectionable odors of grass silages.

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SCIENTISTS IMPROVE ROASTIN' EARS!

There are fastidious people who will not take fried chicken directly in the hand. Others neatly fork out the seeds from watermelon, thereby missing the pleasure of ejecting a mouthful of slippery pellets. And still others—heaven help them—actually slice the kernels from an ear of eatin' corn instead of picking the cob up in their fingers, hot, salted, dripping with butter, and running it back and forth between their teeth typewriter style.

Such, one supposes, will be glad to learn that agricultural experimenters are working to develop glumeless corn.

Glumes are what sticks between the teeth of a corn on the cob eater. They are the leathery envelopes that partly encase each kernel. They prevent the eater, so it's claimed, from getting at the part of the kernel richest in vitamins and proteins. They annoy the corn canners because they reduce the size of the kernel. The scientists, therefore, have set out to improve on nature in this respect. Having seen their handiwork from the Burbank potato to the wingless chicken, one has no doubt but that they will succeed.